WARM UP:

1) I want to create a 99% confidence interval and I want a margin of error of 5%. I know from previous studies that the proportion should be close to 72%. What size sample should I take? $0.05 = 2.576\sqrt{\frac{(0.72)(0.28)}{n}}$

$n = 536$

2) I want to estimate the true % of people who wear their seatbelts when driving. I take a sample of 320 people and find that 275 people say they wear their seatbelts while driving. Create a 92% confidence interval (and interpret).

$\boxed{Z^* = 1.751}$

$\hat{p} = \frac{275}{320} = 0.859$

$* \ \hat{p} \pm z^*\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$

$0.859 \pm 1.751\sqrt{\frac{(0.859)(0.141)}{320}}$

$0.859 \pm 0.034$

$(0.825, 0.893)$

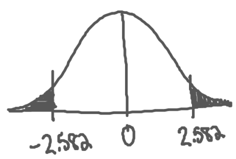
We are 92% conf. that the true % of people who wear seatbelts is btw. 82.5% and 89.3%

9.2 notes worksheet ANSWERS:

1) $p = 0.40$ $\quad \hat{p} = 8/40 = 0.20$ $\quad n = 40$ $\quad \alpha = 0.01$

Ho: $p = 0.40$
Ha: $p \neq 0.40$

$Z = \frac{0.20 - 0.40}{\sqrt{\frac{(0.4)(0.6)}{40}}} = -2.582$




$2 \cdot P(Z > 2.582) = 0.0098$

$2 \cdot P(z < -2.582) = 2 \cdot \text{normalcdf}(-E99, -2.582, 0, 1)$

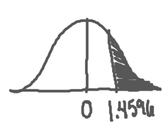
We reject Ho b/c p-value of $0.0098 < \alpha = 0.01$. We have sufficient evidence that the true % of patients suffering serious side effects from the med is not equal to 40%.

Complete problems #2 and 3

② $p = 0.10$ $\quad \hat{p} = 9/57 = 0.158$ $\quad n = 57$ $\quad \alpha = 0.05$

Ho: $p = 0.10$
Ha: $p > 0.10$

$Z = \frac{0.158 - 0.10}{\sqrt{\frac{(0.10)(0.90)}{57}}} = 1.4596$




$P(Z > 1.4596) = 0.0722$

normalcdf(1.4596, E99, 0, 1)

We do not reject the claim b/c p-value of $0.0722 > \alpha = 0.05$.

We do not have evidence that the % of people who feel ill when exposed to radiation is greater than 10%.

2) $p = 0.10$  $\hat{p} = 9/57 = 0.1579$  $n = 57$  $\alpha = 0.05$

Ho: $p = 0.10$
Ha: $p > 0.10$

$$Z = \frac{0.1579 - 0.10}{\sqrt{\frac{(0.10)(0.90)}{57}}} = 1.4571$$

$P(Z > 1.4571) = 0.0725$

We fail to reject Ho b/c p-value of $0.0725 > \alpha = 0.05$. We ***do not*** have sufficient evidence that the true % of patients suffering ill effects from the radiation is greater than 10%.

3) $p = 0.75$  $\hat{p} = 85/125 = 0.68$  $n = 125$  $\alpha = 0.03$

Ho: $p = 0.75$
Ha: $p < 0.75$

$$Z = \frac{0.68 - 0.75}{\sqrt{\frac{(0.75)(0.25)}{125}}} = -1.807$$

$P(Z < -1.807) = 0.0354$

We fail to reject Ho b/c p-value of $0.0354 > \alpha = 0.03$. We ***do not*** have sufficient evidence that the true % of union members who will strike is less than 75%.

Create your Ch. 9 Cheat sheet

Name Ch. 9

Confidence Intervals:

$$\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = (a, b)$$

We are ___% confident that the true % of _____ is btw a and b.

$$M = z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Finding the sample size

on calc:

① $\left(\frac{m}{z}\right)^2$

② $(\hat{p} * 1-\hat{p}) / Ans$

Hypothesis Tests:

① Ho: $p =$ ___
Ha: $p \gtrless, \neq$ ___

② $$Z = \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}} =$$

③ $P(Z \gtrless$ _____ $) =$
normalcdf(LB, UB, 0, 1)

FOR P-VALUE:
* If $z = -$, use $<$
* If $z = +$, use $>$
* If Ha: $\neq$, do $2 \cdot P(\ )$

④ *If p-value < $\alpha$, we reject

We <u>reject</u> Ho b/c p-value of ___ < $\alpha$= _.
We have sufficient evidence that..... (Ha).

We <u>do not</u> reject Ho b/c p-value of _ > $\alpha$= _
We do not have sufficient evidence that .... (Ha).